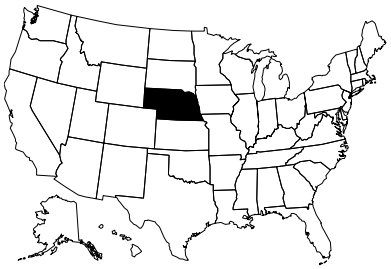
NEBRASKA



Contact Information

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Program Description

Nebraska's biological monitoring program was started in 1985 with semi-quantitative methods for collecting fish and macroinvertebrates. The original purpose was to determine naturally occurring biological delineations within the state and to classify streams based on biological characteristics. In 1997, collection methods were changed to the REMAP methodology because the Nebraska Department of Environmental Quality (NDEQ) felt that more quantitative approaches were needed to summarize the data.

NDEQ's program for adapting the metrics to the standards and fine tuning the metrics has been slowed by data management and computer programming problems. NDEQ has a small staff and time constraints have affected this program. NDEQ is experiencing problems with the reference site concept. Since many of the streams have a "sameness" throughout a large area of the state, Nebraska lacks solid reference sites for the ecoregions and stream classes. Except for a few places, it seems most streams are heavily affected by agricultural use. NDEQ has a lot of data, but is having trouble analyzing it.

Due to concerns about the accuracy of the existing biological indices, NDEQ has chosen to reassess past biological data and redefine its indices. Five streams are currently listed on Nebraska's 303(d) list due to biodiversity impacts. Only about 20% of Nebraska's total stream miles are currently assessed for biology in the 305(b) report. These streams are known to be fully supporting (17%) or not supporting (3%).

Nebraska agrees with the reference site concept but needs to determine if appropriate reference sites exist in Nebraska. NDEQ is currently evaluating macroinvertebrate and fish data to locate both excellent and severely impaired sites in order to determine the appropriate habitat conditions that correspond to both extremes. Reference site criteria have not yet been finalized.

Documentation and Further Information

Nebraska DRAFT 2000 305(b) report

DRAFT 2002 303(d) report, 2001, *Comprehensive Study of Water Quality Monitoring*, and Title 117 - Nebraska's Surface Water Quality Standards are available online at http://www.ndeq.state.ne.us

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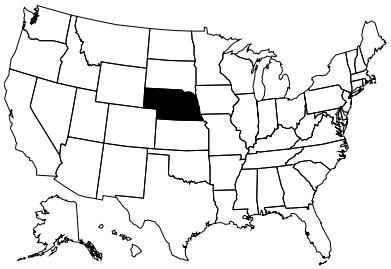

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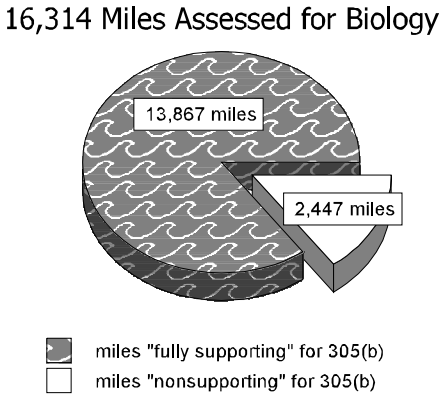
Programmatic Elements

Uses of bioassessment within overall water quality program	✓	problem identification (screening)
	✓	nonpoint source assessments
	✓	monitoring the effectiveness of BMPs
	✓	ALU determinations/ambient monitoring
	✓	promulgated into state water quality standards as biocriteria
		support of antidegradation
		evaluation of discharge permit conditions
		TMDL assessment and monitoring
		other:
Applicable monitoring designs	✓	targeted (i.e., sites selected for specific purpose) (*specific river basins or watersheds*)
	✓	fixed station (i.e., water quality monitoring stations) (*comprehensive use throughout jurisdiction*)
		probabilistic by stream order/catchment area
	✓	probabilistic by ecoregion, or statewide (*comprehensive use throughout jurisdiction*)
	✓	rotating basin (*comprehensive use throughout jurisdiction*)
		other:

Stream Miles

Total miles *(determined using RF3)*	**81,573**
Total perennial miles	16,090
Total miles assessed for biology*	**16,314**
fully supporting for 305(b)	13,867
non-supporting for 305(b)	2,447
listed for 303(d)	0
number of sites sampled *(on an annual basis)*	40
number of miles assessed per site	site specific



*The 16,314 stream miles assessed for biology are the streams known to be only very high fully supporting (13,867) and very low non-supporting (2,447).

Aquatic Life Use (ALU) Designations and Decision-Making

ALU designation basis	Class system (A, B, C), Fishery Based Uses, Warm Water vs. Cold Water	
ALU designations in state water quality standards	Four designations: Warmwater A, Warmwater B, Coldwater A, Coldwater B	
Narrative Biocriteria in WQS	Procedures used to support narrative biocriteria located in various reports, e.g., biological classification, 305(b), bioassessment procedures	
Numeric Biocriteria in WQS	none	
Uses of bioassessment data in integrated assessments with other environmental data (e.g., toxicity testing and chemical specific criteria)	✓	assessment of aquatic resources
	✓	cause and effect determinations
		permitted discharges
		monitoring (e.g., improvements after mitigation)
		watershed based management
Uses of bioassessment/ biocriteria in making management decisions regarding restoration of aquatic resources to a designated ALU	none	

Reference Site/Condition Development*

Number of reference sites	**38 total**	
Reference site determinations	✓	site-specific
		paired watersheds
	✓	regional (aggregate of sites)
	✓	professional judgment
		other:
Reference Site Criteria	No waste water treatment plants, other point sources, or concentrated animal feeding operations (CAFOs); good instream habitat, riparian habitat, land use and cover, physical and chemical parameters, biological metrics, and faunal assemblages; no altered hydrologic regimes; representativeness. At a minumum, sites need to be in the top 10 to 20 percent of all sites sampled in the ecoregion, with little disturbance and no spills or discharges within sites area.	
Characterization of reference sites within a regional context		historical conditions
	✓	least disturbed sites
		gradient response
		professional judgment
	✓	other: regionally representative, reasonably attainable
Stream stratification within regional reference conditions	✓	ecoregions (or some aggregate) *(there are three ecoregions and six strata with roughly five reference sites in each)*
		elevation
	✓	stream type
		multivariate grouping
		jurisdictional (i.e., statewide)
		other:
Additional information	✓	reference sites linked to ALU
		reference sites/condition referenced in water quality standards
	✓	some reference sites represent acceptable human-induced conditions

*Reference site criteria have not been finalized. These responses are based on NDEQ's current efforts to evaluate reference sites and condition.

Field and Lab Methods

Assemblages assessed	✓	benthos *(<100 samples/year, single season, multiple sites - broad coverage)*
	✓	fish *(<100 samples/year, single season, multiple sites - broad coverage)*
		periphyton
		other:
Benthos		
sampling gear		surber, multiplate, collect by hand, D-frame, dipnet; 200 - 400 micron mesh
habitat selection		multihabitat, artificial substrate, woody debris
subsample size		300 count, entire sample
taxonomy		genus, species
Fish		
sampling gear		backpack electrofisher, boat electrofisher, pram unit (tote barge), seine; 1/4" mesh
habitat selection		pool/glide, riffle/run (cobble), multihabitat
sample processing		length measurement (gamefish only), anomalies
subsample		batch
taxonomy		species
Habitat assessments		visual based, quantitative measurements; performed with bioassessments
Quality assurance program elements		standard operating procedures, quality assurance plan, taxonomic proficiency checks and specimen archival

Data Analysis and Interpretation*

Data analysis tools and methods	✓	summary tables, illustrative graphs
	✓	parametric ANOVAs
		multivariate analysis
	✓	biological metrics *(aggregate metrics into an index)*
		disturbance gradients
		other:
Multimetric thresholds		
transforming metrics into unitless scores		95th percentile of reference population, dependent upon approach
defining impairment in a multimetric index		25th percentile of reference population
Evaluation of performance characteristics	✓	repeat sampling *(revisit sites)*
		precision
		sensitivity
		bias
		accuracy
Biological data		
Storage		STORET, Excel and MS Access spreadsheets
Retrieval and analysis		SAS, Minitab

*****NDEQ is testing different indices for validity and, as mentioned earlier, is still exploring reference criteria. Responses are based on NDEQ's current evaluation efforts, which include several changes in the way past biological data were evaluated. Data analysis procedures may change before metrics, indices, and reference sites are finalized.